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Impact of AI on Education & AI Powered Age Detection System

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Abstract:

Artificial Intelligence is growing fast and rapidly it is being used almost everywhere in our daily lives. It has made our lives simpler in many ways but at the same time it has also brought some serious problems with it. One of the biggest concerns today is that children are misusing AI technologies and getting access to adult or explicit content very easily which should not be appropriate for upcoming generation. The goal of this research is to check impact of AI on education & predict age of a person just by analyzing his face and to find solution for global problem the misuse of AI technologies by children, like accessing abusive and explicit content. The increasing usage of artificial intelligence (AI) in all sectors its benefits and drawbacks are also increasing. The model is designed to predict an individuals age from facial features. The system first applies face detection mechanism to extract facial features from input image using Convolutional Neural Networks (CNNs) feature extraction mechanism. These cropped faces are then passed into a deep learning model which is trained on a secondary dataset of faces labeled with age, gender and race. The model extracts eye features because eyes carries distinct patterns, wrinkles, and shape variations that strongly correlates with age. By analyzing a new image model detects its facial characteristics and matches it with features stored in input data. By using Machine Learning classification algorithms model predicts age of new individual. On the basis of categories like child, adult and elder model applies content based restrictions on it. AI has huge benefits in fields like education, healthcare.

Keywords: Artificial Intelligence, Age Detection, Facial Analysis, CNN, Deep Learning, Machine Learning, Age-based Restrictions, Ethical AI, Digital Awareness.

Introduction:

In today's digital world, online platforms such as social media, video streaming services, gaming applications, and educational websites are widely used by people of all age groups. However, unrestricted access to digital content can expose children and minors to inappropriate, harmful, or age- restricted material. Ensuring digital safety and proper content regulation has therefore become a major concern for governments, organizations, parents, and platform providers.

Existing age verification methods mainly de- pend on user-provided information such as date of birth, identity documents, or manual checks. These methods are often unreliable, easy to manipulate, and not suitable for real-time applications. As a result, there is a strong need for an automated, accurate, and real-time age detection mechanism. The AI Powered Real-Time Age Detection System uses computer vision and machine learning techniques to estimate a person's age by analyzing facial features captured through a camera.

This project aims to design and implement a real-time age detection system that can be integrated with digital platforms for content control and safety enforcement. The proposed system helps in protecting

minors from inappropriate con- tent, supports parental control mechanisms, and assists digital service providers in complying with age-based regulations.

Objectives of the Study:

1. To study the impact of AI, awareness & bene- fits of AI in Education.
2. To study and analyze how Artificial Intelligence is transforming the education system and its effect on student learning, teaching method- ology, and overall academic performance.
3. To develop an AI-based system that can detect and predict a person's age accurately by analyzing their facial features using deep learning.
4. To build and evaluate a combined system that integrates age detection and content filtering to provide a safe and suitable digital learning environment for users of all age groups.

Literature Review:

1. Research Paper Review: AI in Education

1. Artificial Intelligence, Machine Learning and Deep Learning in Advanced Robotics, a Review

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Journal: http://www.keaipublishing. com/en/journals/cognitive-robotics/

The research paper [1] gives a clear and simple example of how AI is changing education systems. The field is organized into four main goals:

Helping Teachers, Custom Learning, Bet- ter testing, Digital tutors AI takes over routine, boring tasks so that teachers can focus entirely on teaching instead of paperwork like maintaining students data, AI tools can give personalized lessons, Intelligent Tutoring Systems (ITS) act like a human teacher, giving one-on-one help and continuous, personalized feedback to every student.

2. Artificial Intelligence in Education (AIEd): A High-Level Academic and Industry Note 2021

Authors: Muhammad Ali Chaudhry1, Emre Kazim2

Received: 25 April 2021 / Accepted: 17 June 2021/ Published: 7 July 2021

This research paper [2] gives a clear and simple idea of how AI is Impacting on Schools and Teachers. The study found four main themes about AI in education:

- The first theme is about AI products like VR classrooms, assistant robots, and personalized learning systems that help students learn in their own way.
- The second theme talks about the risks, like learning becoming too mechanical, ethical is- sues, less need for teachers, and reduced social interaction.
- People are also worried that AI might reduce jobs for teachers and professionals, but experts say those who know how to use AI will have more opportunities.

3. Age Estimation via Face Images: A Survey

Angulu et al. [4] According to The researchers explained that the accuracy of age estimation systems mainly depends on two things: how facial data is captured and represented, and which method is used to predict age. Differ- ent techniques work better in different situations—for example, some methods analyze fa- cial shape and appearance, while others study how faces change with age or use multiple im- ages of the same person over time. They also found that the best results often come from combining

methods, such as first predicting an age group and then estimating the exact age. To measure system performance properly, they recommend using more than one metric, like MAE and CS, because a single measure may not show the full accuracy. The study also suggests that more research is needed in areas like combining facial features, analyzing specific parts of the face, and considering lifestyle or environmental factors that affect aging. In addition, the authors emphasize the need for larger and more diverse datasets so that age estimation systems can work reliably for people from different backgrounds.

2. Data Visualization:

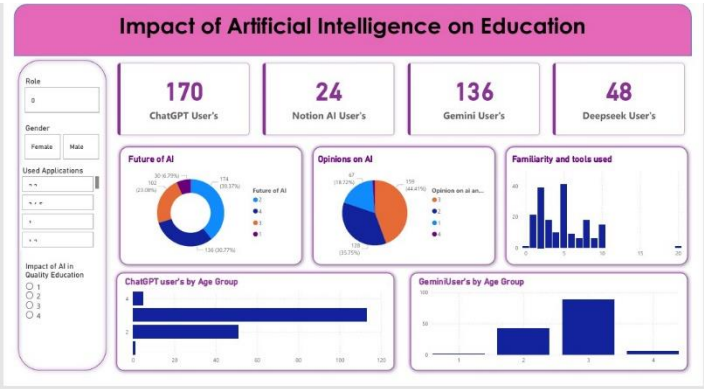

Figure 1: Impact of AI on Education.

- Looking at the dashboard, we can clearly see that AI tools have become a common part of education today. Out of all the AI tools, Chat- GPT is the most popular with 170 users. After that comes Gemini with 136 users, Deepseek with 48 users, and Notion AI with only 24 users.
- This tells us that most students and teachers prefer using ChatGPT for their studies and work. When people were asked about the future of AI in education, most of them gave a positive response. This means people believe that AI will play a bigger and better role in education going forward.
- The opinions on AI also show that the majority of respondents feel good about using AI in their learning journey. They see it as helpful and useful rather than something to be afraid of. From the age group charts, we can see that younger people and students use AI tools the most, especially ChatGPT and Gemini.

Statistical Analysis:

1. Reliability and Validity:

Cronbach's Alpha for the 'data': Sample units: 185, $\alpha = 0.601$.

Interpretation: The Cronbach's Alpha value of 0.601 indicates that the questionnaire used for collecting primary data is reasonably reliable and the items are sufficiently related to measure the intended concepts.

2. McDonald's Omega (Total):

Table 1: McDonald's Omega Reliability by Construct

Construct	Ω_{total}	**Interpretation**
AI_Familiarity	0.9614	Excellent
AI_Benefits	0.5952	Poor
AI_Trust	0.6154	Questionable
AI_Adoption	0.8625	Good
Overall	**0.8703**	**Good**

McDonald's Omega – Conclusion: The results show that the survey items measuring AI Familiar- ity have excellent reliability, AI Adoption shows good reliability, AI Trust has moderate reliability, and AI Benefits shows relatively lower reliability. However, the overall reliability value is 0.8703, which indicates good reliability for the entire questionnaire. This shows that the primary data collected through the survey is generally reliable and suitable for further analysis in the research.

3. Descriptive Statistics:

Table 2: Descriptive Statistics

Variable	N	Mean	SD	Min	Max
Familiarity with AI in education	185	1.649	0.715	1.0	4.0
Awareness of AI in Education	185	2.022	0.737	1.0	4.0
Tools used	185	1.449	0.729	1.0	4.0
Usage of tools	185	1.535	0.722	1.0	4.0
Advantage of AI in education	185	2.524	1.745	1.0	4.0
Impact of AI in Quality Education	185	1.557	0.606	1.0	4.0
Changed in Performance	185	1.816	0.736	1.0	4.0
AI tools helped in	185	1.389	0.814	1.0	4.0
Impact on problem-solving ability	185	1.595	0.593	1.0	4.0
Concerns about AI in education	185	2.081	1.098	1.0	4.0
Incorrect or misleading info	185	2.016	0.869	1.0	4.0
Trust on AI tools	185	2.335	0.734	1.0	4.0
AI tools used in next year	185	1.654	0.691	1.0	4.0
AI recommendation	185	2.000	0.801	1.0	4.0
Future of AI	185	2.389	0.967	1.0	4.0
Equal access to education	185	1.973	0.646	1.0	4.0
AI in curriculum	185	1.984	0.844	1.0	4.0

Conclusion

1. Sample Size: The study was conducted on 185 respondents.

2. Awareness and Familiarity with AI: The mean values indicate that students have moderate to good awareness and familiarity with AI in education. The descriptive statistics show that students have a moderate to high level of awareness and familiarity with AI in education. The results indicate that many students are using AI tools for academic purposes, and they generally perceive a positive impact on their academic performance and problem-solving abilities.

4.Chi-Square Test

Hypotheses:

H0: AI usage and academic performance are independent.

H1: AI usage and academic performance are associated.

From Chi-square table: At $\alpha = 0.05$, $df = 6$,
Critical value: $\chi^2_{\text{critical}} = 12.592$
From Chi-Square Statistics: $\chi^2_{\text{calculated}} = 17.61$
Decision Rule: $\chi^2_{\text{calculated}} > \chi^2_{\text{critical}}$

Conclusion: from chi square test there is a significant relationship between students AI usage and their academic performance this shows that AI could play an important role in affecting students' learning outcomes or results.

Table 3: Chi-Square Test Results

Test	χ^2	df	p-val	Result
AI familiarity vs Awareness	34.487	9	0.0001	Significant
AI usage vs Academic performance	17.614	9	0.0399	Significant
Trust in AI vs Recommend AI	16.423	9	0.0586	Not Sig.
Trust in AI vs Continue using AI	16.349	9	0.0599	Not Sig.
Awareness vs Trust	13.188	9	0.1543	Not Sig.
Role vs AI usage frequency	0.450	3	0.9297	Not Sig.
AI improves edu vs Recommend AI	12.098	9	0.2078	Not Sig.
Concern about AI vs Trust	7.177	9	0.6187	Not Sig.
AI access vs Mandatory AI training	7.149	3	0.0673	Not Sig.

5. Correspondence Analysis:

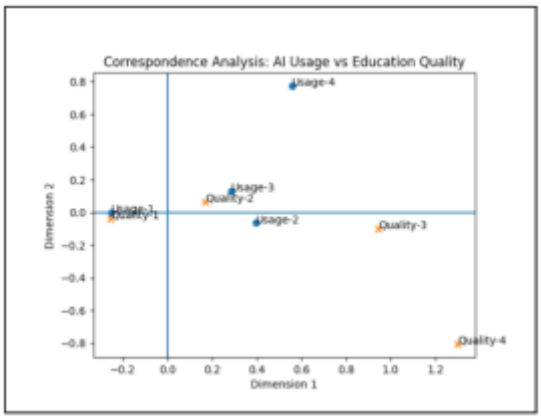

Figure 2: Correspondance Analysis.

Conclusion: The correspondence analysis indicates a clear association between AI tool usage and students' perception of education quality. Higher levels of AI usage are closely linked with more positive educational outcomes, while lower usage corresponds to weaker perceived impact. This suggests that increased adoption of AI tools is associated with improved learning experiences among students.

Age Detection System:

Figure 3: Age Detection Model Overview.

1. Applications of Facial Age Estimation:

Automatic facial age estimation has numerous practical applications across different domains [4]:

• **Age Simulation:** Age estimation enables prediction of future facial appearance by analyzing aging patterns. This is particularly useful in missing persons investigations where simulated aged images assist in identification after years of absence.

• **Customer Analytics:** Businesses can use automatic age estimation to customize products and services for customers of different age groups, improving customer experience and targeted marketing.

• **Security and Surveillance:** Age estimation prevents underage access to restricted products and content including alcohol, cigarettes, and adult media. It also enhances banking security and supports healthcare systems in providing age-appropriate services.

• **Content Access Control:** Intelligent content filtering systems can use age estimation to automatically restrict children from accessing ageinappropriate content on television and internet platforms.

These diverse applications highlight the importance of developing accurate and robust automatic age detection systems, motivating the research presented in this paper.

2.Facial Feature Extraction:

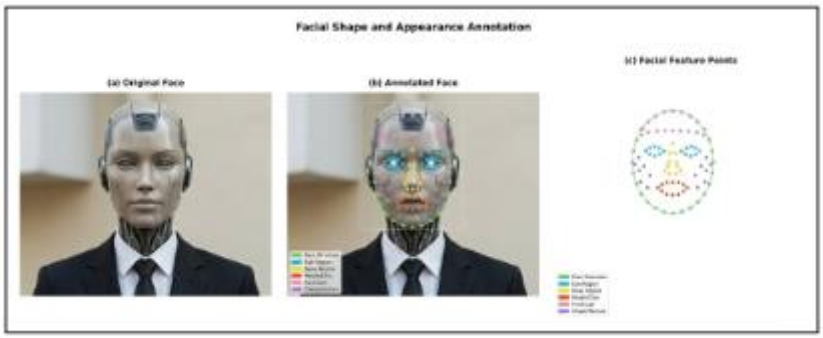

Figure 4: Facial Feature Extraction. Image (a) shows the original face photograph. Image (b) shows the same face with colored dots marking the six feature regions — eye region in blue, nose region in yellow, mouth and chin in orange, forehead in pink, cheek and skin texture in purple, and face boundary in green. Image (c) shows only the feature points.

After detecting the face in the image, we extract important facial features from six key regions of the face. These regions are the eyes, nose, mouth and chin, forehead, cheeks, and the overall face boundary. Each of these regions tells us something different about a person's age.

The first region we look at is the eyes. Eyes are very useful for estimating age because they change throughout a person's life. In children and young adults, the size and spacing of the eyes change as the face grows. In older people, the skin around the eyes becomes wrinkled and loose. We measure the length and width of each eye, the distance between both eyes, and the texture of the skin around the eye area. These measurements give us strong clues about whether a person is young or old.

The second region is the nose. The nose grows and changes shape significantly during childhood and early adulthood. We measure the width of the nose compared to the total face width, the length of the nose compared to the face height, and the position of the nose tip on the face.

The third region is the mouth and chinarea. The lips and chin also change with age. In younger people, lips are fuller and the chin is more defined.

In older people, the skin around the mouth develops fold lines and the lips become thinner. We extract the width and height of the mouth, the texture of the skin around the lips, and the shape of the chin.

The fourth region is the forehead. The forehead is usually one of the first parts of the face to show signs of aging. Horizontal lines and wrinkles appear on the forehead as a person gets older. In younger people, the forehead skin is smooth and even. In older people, the forehead has visible lines and uneven texture. We extract texture features from the forehead region that measure how smooth or rough the skin appears. These texture features become increasingly useful for estimating ages above 35 years.

The fifth region is the cheeks and skin texture. The cheeks provide the most detailed information about skin aging. As people grow older, the skin loses a protein called collagen which keeps it firm and smooth. This loss of collagen makes the skin look thinner, darker, and less elastic over time.

Wrinkles and spots also appear on the cheek area. We extract skin texture features from both cheeks that measure the roughness and pattern of the skin surface. These cheek texture features are the most powerful indicators of age for people above 40 years.

The sixth region is the overall face boundary. The shape of the face itself changes with age. Research has shown that a child's face is more circular and rounded, while an adult's face becomes more oval shaped. We measure the ratio of face width to face height, the shape of the jawline, and the overall facial proportions. These measurements capture the big picture changes in face shape that happen from childhood to adulthood.

3.System Pipeline:

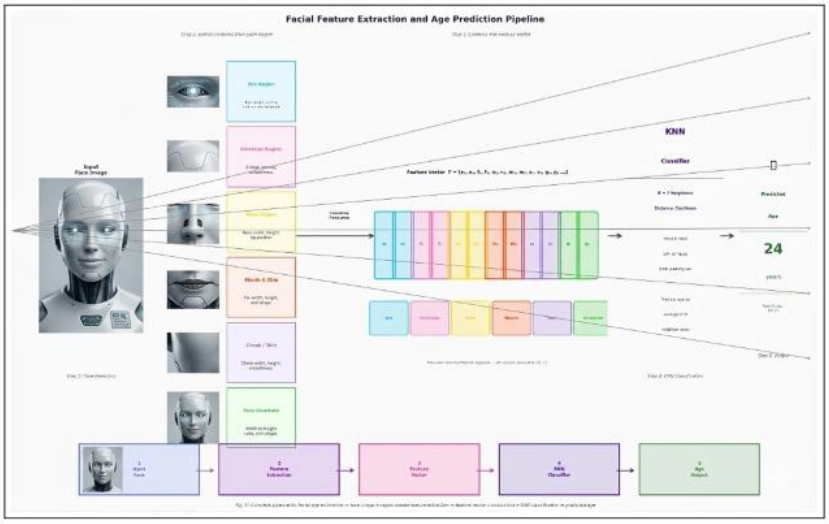

Figure 5: System Pipeline: End-to-end process of age estimation from face photograph input to age group output.

The complete step-by-step process of how the system estimates the age of a person from a face photograph is divided into five main steps:

In the first step, a face photograph is taken as input. We used face images from the UTKFace dataset which contains more than 23,000 real face photographs of people with ages ranging from 1 year to 116 years. Before doing anything else, we first detect and locate the face in the photograph using a face detection algorithm. Once the face is found, we crop it out so that only the face area is used for further processing.

In the second step, we look at six different parts of the detected face and extract useful measurements and patterns from each part. The first part is the eye region where we measure the length and width of both eyes and the distance between them. The second part is the forehead region where we look at

how smooth or rough the skin is because wrinkles start appearing on the forehead as a person gets older. The third part is the nose region where we measure the width and length of the nose and the position of the nose tip on the face. The fourth part is the mouth and chin area where we measure the width and height of the mouth and the shape of the chin. The fifth part is the cheek and skin region where we study the texture of the skin because skin becomes rougher and loses its firmness as age increases. The sixth part is the overall face structure where we measure the ratio of face width to face height and the general shape of the face.

In the third step, all the measurements and patterns collected from the six facial regions are combined together into a single list of numbers. This list is called a feature vector. Think of it like a report card for the face where each number tells something specific about that face. For example the first two numbers in the vector represent eye features, the next two represent forehead features, followed by nose features, mouth features, skin texture features, and face structure features. After combining all the numbers, we apply a process calledmin-max normalization which simply scales all the numbers to fall between 0 and 1. This is done so that no single feature has more influence than others during the age prediction step.

In the fourth step, the feature vector is given to a machine learning algorithm called K-Nearest Neighbor or KNN. The way KNN works is very simple and easy to understand. It looks at the feature vector of the new face and compares it with the feature vectors of all the faces it has already seen during training. It then finds the 7 most similar faces from the training data. These 7 similar faces are called the nearest neighbors. The distance between feature vectors is measured using a method called Euclidean distance which is basically a way to calculate how close or far two sets of numbers are from each other. Once the 7 nearest neighbors are found, the system takes the average of their ages to predict the age of the new face.

In the fifth and final step, the system gives the predicted age as the output. Along with the age in years, the system also tells which age group the person belongs to such as 18 to 25 years or 25 to 35 years. This output can be used in many real world applications such as security systems, healthcare, and content access control as discussed in the earlier sections of this paper.

The key advantage of this pipeline is that it breaks down the complex problem of age estimation into simple and understandable steps. Each step has a clear purpose and the features extracted are directly connected to real biological changes that happen in the human face as a person grows older. This makes the approach not only accurate but also easy to explain and understand compared to black box deep learning methods.

Conclusion:

- The study clearly shows that AI tools like ChatGPT and Gemini are widely used in education and due to overuse of AI technologies its negatively impacting on students creativity and problem solving skills [2].
- Students are using AI as a replacement for their own thinking not for learning purposes.
- The age detection system developed using machine learning, deep learning which successfully predicts a person's age through facial analysis and has MAE 5.5 years [4].
- Overall this project proves that AI has a powerful and growing role in education if it used ethically [3]. The mostly used AI tools are ChatGPT, Canva AI, Deepseek, Google Gemini, Microsoft Copilot, Claude.

- AI is significantly impacting the Education sector, manufacturing sector through automation, robotics, and smart factory systems [1].

Limitations of the Study:

- **Limited Dataset for Age Detection:** The age detection model was trained on a limited dataset, which means it may not perform accurately in all real world conditions such as different lighting, angles, skin tones, or image quality.
- **Small Survey Sample:** The primary data was collected from a limited number of respondents through Google Forms, so the findings may not fully represent the opinions of the entire population.
- **Age Group Bias:** Most of the survey respondents belong to a specific age group, mostly students and young adults, which means the results may be biased and may not reflect the views of older age groups or working professionals.
- **Limited AI Tools Covered:** The study only focused on a few AI tools. There are many other AI tools used in education that were not included in this study.
- **Privacy Concerns:** Using facial recognition technology to detect age raises privacy and ethical concerns, as collecting and processing facial data of individuals especially minors requires strict data protection measures.

Future Scope of the Study:

- The age detection system can be made more accurate in the future by training it on a larger and more diverse dataset covering different skin tones, lighting conditions, and facial expressions [4].
- In the future, the content filtering system canbe expanded to work on social media platforms, streaming websites, and online educational portals to provide safer digital experiences for children and young users.
- The current study focused on primary data from a limited number of respondents, so future research can be conducted on a larger scale across different cities, schools, and universities to get more accurate and generalized results.
- The age detection model can be further improved to detect not just age but also emotions and attention levels of students during online classes, helping teachers understand student engagement better [1].
- Future studies can explore the use of AI personalized learning systems that automatically adjust the difficulty level and type of content based on the age and performance of each individual student [2].
- The impact of AI on education can be studied more deeply across different subjects, grade levels, and socioeconomic backgrounds to understand where AI helps the most [3].

References:

1. Soori, M., Arezoo, B., & Dastres, R. Artificial intelligence, machine learning and deep learning in advanced robotics, a review. Cognitive Robotics. Available at: http://www.keaipublishing.com/en/journals/cognitive-robotics/
2. Chaudhry, M. A., & Kazim, E. (2021). Artifi-cial Intelligence in Education (AIEd): a high level academic and industry note. Received:25 April 2021 /Accepted:17 June 2021 /Published online:7 July 2021.

3. Bit, D., Das, K., Biswas, S., & Nag, M. (2024). The Impact of Artificial Intelligence in Educational System. International Journal of Scientific Research in Science and Technology, August 2024. Authors affiliated with Kuntala Das College of Education, Bharat Technology, and NEF College of Pharmaceutical Education and Research.
4. Angulu, R., Tapamo, J. R., & Adewumi, A. O. (2018). Age estimation via face images: a survey. University of KwaZulu-Natal, School of Mathematics, Statistics and Computer Science (Westville, Durban, 4000 South Africa) and School of Engineering (Howard, Durban,4041 South Africa).
5. Raval, M. J., & Shankar, P. (2015). Age invariant face recognition using artificial neural network. International Journal of Advance Engineering Research and Development, 2, 121–128.
6. Sonu, A., Sushil, K., & Sanjay, K. (2014). A novel idea for age invariant face recognition. International Journal of Innovative Research in Science, Engineering and Technology, 3, 15618–15624.